CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/W.No.11/KRIDL/CSR-08/107h/CEMENT/2016-17 Date: 03.08.2016

TEST REPORT ON CEMENT

* CUSTOMER	:	**Asst. Executive Engineer**, Vidyaranyapura Sub Division, BBMP, Bangalore.
*AGENCY	:	**Executive Engineer,** KRIDL, Bangalore.
*NAME OF THE WORK	:	Development and improvements to roads and drains in main road and cross roads in Ward No.11, Kuvempunagara, Vidyaranyapura Sub Division, BBMP, Bangalore.
*REFERENCE	:	BBMP/EE/BTP/WO/76/2016-17 Dated: 20.07.2016
SAMPLE ID	:	Cement
SAMPLE RECEIVED ON	:	01.08.2016
PERIOD OF TESTING	:	01.08.2016 to 03.08.2016

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988(RA-2009)	29.00 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988(RA-2009)	145 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5) 1988(RA-2009)	485 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988(RA-2009)	1 mm	Not more than 10mm

*Information is furnished by the Customer/Representative.

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Building & Highway Material Testing Laboratory

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T-2377

Job No.: CTCE/BBMP/W.No.11/KRIDL/CSR-08/107h/SAND-Gradation/2016-17 : 03.08.2016

TEST REPORT ON DETERMINATION GRADATION OF FINE AGGREGATES

* Customer	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
* Agency	: **Executive Engineer,** KRIDL, Bangalore.
* Name of Work	: Development and improvements to roads and drains in main road and cross roads in Ward No.11, Kuvempunagara, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: BBMP/EE/BTP/WO/76/2016-17 Dated: 20.07.2016
Technical Reference	: IS : 2386 Part 1 - 1963 RA-2007
Sample ID	: Fine Aggregates
Sample Received on	: 01.08.2016
Date of Testing	: 03.08.2016

Total Wt. of Aggregates in gms **1000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	96.80	90-100	90-100	90-100	95-100
2.36	78.60	60-95	75-100	85-100	95-100
1.18	58.70	30-70	55-90	75-100	90-100
600 Micron	29.70	15-34	35-59	60-79	80-100
300 Micron	15.50	5-20	8-30	12-40	15-50
150 Micron	5.70	0-10	0-10	0-10	0-15

* Information is furnished by the Customer/Representative

Civil-Tech Consultants & Engineers Bangalore

Remarks : This sample is under Zone-I specific limits.

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Job No.: CTCE/BBMP/W.No.11/KRIDL/CSR-08/107h/AGG/GR/2016-17 : 03.08.2016

TEST REPORT ON DETERMINATION GRADATION OF COARSE AGGREGATES

* Customer	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
* Agency	: **Executive Engineer,** KRIDL, Bangalore.
* Name of Work	: Development and improvements to roads and drains in main road and cross roads in Ward No.11, Kuvempunagara, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: BBMP/EE/BTP/WO/76/2016-17 Dated: 20.07.2016
Technical Reference	: IS : 2386 Part 1 -1963 RA-2007
Sample ID	: Coarse Aggregates (40mm)
Sample Received on	: 01.08.2016
Date of Testing	: 03.08.2016

Total Wt. of Aggregates in gms= **7000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)	
		Graded	Single Sized
80	100	100	-
63	100	-	100
40	98.16	95-100	85-100
20	37.93	30-70	0-20
10	19.43	10-35	0-5
4.75	3.39	0-5	-

* Information is furnished by the Customer/Representative

Civil-Tech Consultants & Engineers Bangalore

Remarks : This sample is under Graded specific limits.

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T-2377

Job No.: CTCE/BBMP/W.No.11/KRIDL/CSR-08/107h/CUBE/2016-17 07.09.2016

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

* Customer	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
* Agency	: **Executive Engineer,** KRIDL, Bangalore.
* Name of the work	: Development and improvements to roads and drains in main road and cross roads in Ward No.11, Kuvempunagara, Vidyaranyapura Sub Division, BBMP, Bangalore.
* Reference	: BBMP/EE/BTP/WO/76/2016-17 Dated: 20.07.2016
* Sample ID	: Road Concrete
Size of cubes	: 150mmx150mmx150mm
Cross Sectional Area	: 22500 mm^2
Technical Reference	: IS: 516-1959 (Reaffirmed 2008)
* Grade of Concrete	: M_{20}
Compressive Strength as on	: 28th day
Sample Received on	: 07.09.2016

Sl.No.	* Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	10.08.2016	07.09.2016	8.102	482.3	21.44
2	10.08.2016	07.09.2016	8.260	498.3	22.15
3	10.08.2016	07.09.2016	8.356	510.2	22.68

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Job No.: CTCE/BBMP/W.No.11/KRIDL/CSR-08/107h/CUBE/2016-17 09.09.2016

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

* Customer	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
* Agency	: **Executive Engineer,** KRIDL, Bangalore.
* Name of the work	: Development and improvements to roads and drains in main road and cross roads in Ward No.11, Kuvempunagara, Vidyaranyapura Sub Division, BBMP, Bangalore.
* Reference	: BBMP/EE/BTP/WO/76/2016-17 Dated: 20.07.2016
* Sample ID	: Road Concrete
Size of cubes	: 150mmx150mmx150mm
Cross Sectional Area	: 22500 mm^2
Technical Reference	: IS: 516-1959 (Reaffirmed 2008)
* Grade of Concrete	: M_{20}
Compressive Strength as on	: 28th day
Sample Received on	: 09.09.2016

Sl.No.	* Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	12.08.2016	09.09.2016	8.185	489.6	21.76
2	12.08.2016	09.09.2016	8.225	503.2	22.36
3	12.08.2016	09.09.2016	8.358	512.3	22.77

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Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/Gradation/2016-17 : 25.08.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Executive Engineer,** KRIDL, Bangalore.

Name of Work : Development and improvements to roads and drains in main road and cross roads in Ward No.11, Kuvempunagara, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : BBMP/EE/BTP/WO/76/2016-17 Dated: 20.07.2016

Date of Testing : 25.08.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **7465**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	165	165	2.2	97.8	95-100
22.4	2410	2575	34.5	65.5	60-80
11.2	1210	3785	50.7	49.3	40-60
4.75	1005	4790	64.2	35.8	25-40
2.36	965	5755	77.1	22.9	15-30
0.600	810	6565	87.9	12.1	8-22
0.075	650	7215	96.7	3.3	0-8

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Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/S-T/2016-17 25.08.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Executive Engineer,** KRIDL, Bangalore.
Name of Work	Development and improvements to roads and drains in main road and cross roads in Ward No.11, Kuvempunagara, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/76/2016-17 Dated: 20.07.2016
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	25.08.2016

Result : Flakiness Index = **11.68%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index **24.93%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/AIV/2016-17 25.08.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Executive Engineer,** KRIDL, Bangalore.
Name of the Work	Development and improvements to roads and drains in main road and cross roads in Ward No.11, Kuvempunagara, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	BBMP/EE/BTP/WO/76/2016-17 Dated: 20.07.2016
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	25.08.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	386	387	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines	22.02	22.22	
	$100^* (W_2/W_1)\%$			22.12

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/BM/Bitumen/2016-17 14.09.2016

BITUMEN CONTENT DETERMINATION OF BITUMINOUS MACADAM MIX

AS per IRC:SP:-1984

CUSTOMER	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Executive Engineer,** KRIDL, Bangalore.
NAME OF THE WORK	Development and improvements to roads and drains in main road and cross roads in Ward No.11, Kuvempunagara, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	BBMP/EE/BTP/WO/76/2016-17 Dated: 20.07.2016
SAMPLE I/D	Roads in Kuvempunagara ward No.11
DATE OF TESTING	14.09.2016

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	482	482
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	18	18.00
7. Bitumen content in %	3.60	3.60
8. Average	**3.60**	

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Job No.: CTCE/BBMP/W.No.11/KRIDL/BM/Bitumen/2016-17 14.09.2016

GRADATION DETERMINATION OF BITUMINOUS MACADAM MIX

As per IS2386 and IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Executive Engineer,** KRIDL, Bangalore.
NAME OF THE WORK	Development and improvements to roads and drains in main road and cross roads in Ward No.11, Kuvempunagara, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	BBMP/EE/BTP/WO/76/2016-17 Dated: 20.07.2016
SAMPLE I/D	Roads in Kuvempunagara ward No.11
DATE OF TESTING	14.09.2016

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-04 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
26.5	0	0	0	100	100
19	35.15	7.29	7.29	92.71	90-100
13.2	90.23	18.72	26.01	73.99	56-88
4.75	262.3	54.42	80.43	19.57	16-36
2.36	50.22	10.42	90.85	9.15	4-19
0.3	20.32	4.22	95.07	4.93	2-10
0.075	4.52	0.94	96.00	4.00	0-8

Þ The results indicated above are based on the tests carried	Trail 2				Specified Limits as per MORTH specification table 500-04 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
26.5	0	0		100	100
19	32.26	6.69	6.69	93.31	90-100
13.2	80.23	16.65	23.34	76.66	56-88
4.75	260.3	54.00	77.34	22.66	16-36
2.36	52.15	10.82	88.16	11.84	4-19
0.3	22.32	4.63	92.79	7.21	2-10
0.075	11.36	2.36	95.15	4.85	0-8

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Job No: CTCE/BBMP/W.No.11/KRIDL/BC/Bitumen/2016-17 15.09.2016

BITUMEN CONTENT DETERMINATION OF BITUMINOUS CONCRETE MIX

As per IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Executive Engineer,** KRIDL, Bangalore.
NAME OF THE WORK	Development and improvements to roads and drains in main road and cross roads in Ward No.11, Kuvempunagara, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	BBMP/EE/BTP/WO/76/2016-17 Dated: 20.07.2016
SAMPLE I/D	Roads in Kuvempunagara Ward No.11, BBMP, Bangalore.
DATE OF TESTING	15.09.2016

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474	473.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	26	26.50
7. Bitumen content in %	5.20	5.30
8. Average	**5.25**	

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Job No: CTCE/BBMP/W.No.11/KRIDL/BC/Bitumen/2016-17 15.09.2016

BITUMEN CONTENT AFTER GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

As Per IS 2386 and IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Executive Engineer,** KRIDL, Bangalore.
NAME OF THE WORK	Development and improvements to roads and drains in main road and cross roads in Ward No.11, Kuvempunagara, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	BBMP/EE/BTP/WO/76/2016-17 Dated: 20.07.2016
SAMPLE I/D	Roads in Kuvempunagara Ward No.11, BBMP, Bangalore.
DATE OF TESTING	15.09.2016

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	42.36	8.94	8.94	91.06	79-100
9.5	35.21	7.43	16.36	83.64	70-88
4.75	66.35	14.00	30.36	69.64	53-71
2.36	64.52	13.61	43.97	56.03	42-58
1.18	52.36	11.05	55.02	44.98	34-48
0.6	64.21	13.55	68.57	31.43	26-38
0.3	35.29	7.45	76.01	23.99	18-28
0.15	35.48	7.49	83.50	16.50	12-20
0.075	39.66	8.37	91.86	8.14	4-10

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	35.22	7.44	7.44	92.56	79-100
9.5	42.23	8.92	16.36	83.64	70-88
4.75	74.26	15.68	32.04	67.96	53-71
2.36	60.32	12.74	44.78	55.22	42-58
1.18	71.22	15.04	59.82	40.18	34-48
0.6	46.36	9.79	69.61	30.39	26-38
0.3	35.25	7.44	77.06	22.94	18-28
0.15	40.26	8.50	85.56	14.44	12-20
0.075	33.32	7.04	92.60	7.40	4-10

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- The results indicated above are based on the tests carried out on the samples received in the laboratory
- Any Query regarding the report must be reported within 30 days from the date of testing

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